PATENT ABSTRACTS OF JAPAN

(54) **RECORDING AND REPRODUCING DEVICEITS METHOD AND RECORDING MEDIUM**

(57)Abstract:

PROBLEM TO BE SOLVED: To record information representing a detected change by detecting a change in the recorded video and audio data for an idle time when recording and reproduction of video and audio data are not conducted.

SOLUTION: Video and audio data reproduced from a recording medium 5 are to a reproduction data processing system 31in which the data are separated into video dataaudio data and additional informationthe video data are expanded in a video signal band expansion processing system 32a change in the video data is detected by a video signal detection control system 38from which the corresponding additional information is outputted. Furthermorethe audio data are expanded by an audio signal band expansion processing system 41a change in the audio data is detected by an audio signal detection control system 42from which the corresponding additional information is outputted. The additional information is fed to a recording systemwhere the information is recorded on the recording medium 5.

CLAIMS

[Claim(s)]

[Claim 1]Have the following and independently with record to said recording medium of said signal by said 1st recording device said reproduction means Reproduce and said signal recorded on said recording medium said detection means A recording and reproducing device which detects change of said signal reproduced by said reproduction means and is characterized by said 2nd recording device's matching with said signal information which shows change of said signaland recording it on said recording medium when change of said signal is detected by said detection means.

An input means which inputs 1 or two or more signals.

The 1st recording device that records said signal inputted by said input means on a predetermined recording medium.

A reproduction means which reproduces said signal recorded on said recording medium by said 1st recording device.

A detection means to detect change of said signal reproduced by said reproduction meansand the 2nd recording device that matches with said signal information which shows change of said signaland is recorded on said recording medium when change of said signal is detected by said detection means.

[Claim 2]The recording and reproducing device according to claim 1 having further a providing means which provides a signal with which change was detected according to access from the outside by said detection means.

[Claim 3]The recording and reproducing device according to claim 1 having further a display control means which displays a list of information which shows change of said signal detected by said detection means on a predetermined screen.

[Claim 4]The recording and reproducing device according to claim 1 with which said signal is characterized by said detection means detecting change of said video signal including a video signal.

[Claim 5]The recording and reproducing device according to claim 1 with which said signal is characterized by said detection means detecting change of said audio signal including an audio signal.

[Claim 6]When change of said signal is not detected by said detection means as for said 2nd recording deviceMatch with said signalrecord information which shows that it can overwrite on said recording mediumand said 1st recording deviceThe recording and reproducing device according to claim 1 overwriting a new signal if needed to a field to which said signal with which said information which shows that overwrite of said recording medium is possible is matched is recorded.

[Claim 7]An input means which inputs 1 or two or more signals.

The 1st recording device that records said signal inputted by said input means on a predetermined recording medium.

A reproduction means which reproduces said signal recorded on said recording medium by said 1st recording device.

A detection means to detect change of said signal reproduced by said reproduction means.

The 2nd recording device that matches with said signal information which shows change of said signaland is recorded on said recording medium when change of said signal is detected by said detection means.

With record to said recording medium of 1 which is recording and reproducing systems provided with the aboveand was inputtedor two or more of said signalsindependentlyWhen said signal recorded on said recording medium is reproducedchange of said reproduced signal is detected and change of said signal is detectedinformation which shows change of said signal is matched with said signaland it records on said recording medium.

[Claim 8]A recording and reproducing device comprising:

An input means which inputs 1 or two or more signals.

A detection means to detect change of said signal inputted by said input means.

An image recording means which records said video signal on a predetermined recording medium when change of a video signal which constitutes said signal by said detection

means is detected.
A voice recording means for a level of an audio signal which constitutes said signal by said detection means to be beyond a predetermined reference valueand to record said sound on said recording medium while said audio signal is changing within a predetermined base period.

[Claim 9]When 1 or two or more signals are inputtedchange of said inputted signal is detected and change of a video signal which constitutes said signal is detectedRecording and reproducing systems recording said video signal on a predetermined recording mediumand recording said sound on said recording medium while a level of an audio signal which constitutes said signal is beyond a predetermined reference value and said audio signal is changing within a predetermined base period.

[Claim 10]Information which shows change of picture image datavoice dataand said picture image data at leastA recording mediumwherein information which shows change of information which information which shows change of said voice data is recordedand shows change of said picture image dataand said voice data is matched and recorded on said picture image data and said voice data.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention detects change of video information or speech informationconcerning a recording and reproducing devicea methodand a recording mediumand relates to the recording and reproducing device which enabled to carry out record reproduction efficiently [for the purpose of video information or speech information] using the informationa methodand a recording medium.
[0002]
[Description of the Prior Art]Conventionallythe video system for surveillance records the image and sound which were inputted from the surveillance camera on videotapefor example.
Thenhe reproduces it and is trying to check the contents.
At the time of record of an image or a soundchange of an image is detectedand it is related with an image or a sound and is recorded.
Thenwhen checking the contentsenabling it to search the image and sound at the time of change of an image being detected is proposed.

[0003]In VTR (video tape recorder) which carries out recording playback of the usual programthe change (scene change) of a scene is detectedor commercials (CM) are detectedand it considers that it is made not to perform playback or recording of CM. It considers compressing and recording an image on recording mediasuch as an optical disc in which random access is possiblea hard diskor a memory cardin recent years.
[0004]
[Problem(s) to be Solved by the Invention]Howeversince the video system for surveillance had the different characteristic from VTR which carries out record

reproduction of the usual program and operation forms also differedthe technical problem used as the independent system occurred.

[0005]This invention is made in view of such a situationmakes the function to carry out record reproduction of the usual programand to search itand a monitoring function serve a double purposeand enables it to perform more efficiently record of various video voice datareproductionand search.

[0006]

[Means for Solving the Problem]An input means as which the recording and reproducing device according to claim 1 inputs 1 or two or more signalsThe 1st recording device that records a signal inputted by an input means on a predetermined recording mediumA reproduction means which reproduces a signal recorded on a recording medium by the 1st recording deviceWhen change of a signal is detected by detection means to detect change of a signal reproduced by reproduction meansand a detection meansHave the 2nd recording device that matches with a signal information which shows change of a signaland is recorded on a recording mediumand independently record to a recording medium of a signal by the 1st recording device a reproduction meansA signal recorded on a recording medium is reproduceda detection means detects change of a signal reproduced by reproduction meansand when change of a signal is detected by a detection meansthe 2nd recording device matches with a signal information which shows change of a signaland records it on a recording medium.

[0007]The recording and reproducing systems according to claim 7 with record to an inputted recording medium of 1 or two or more signals independentlyWhen a signal recorded on a recording medium is reproducedchange of a reproduced signal is detected and change of a signal is detectedinformation which shows change of a signal is matched with a signaland it records on a recording medium.

[0008]written this invention is characterized by it having been alike and comprising the following at claim 8.

An input means which inputs 1 or two or more signals.

A detection means to detect change of a signal inputted by an input means.

An image recording means which records a video signal on a predetermined recording medium when change of a video signal which constitutes a signal by a detection means is detected.

A voice recording means for a level of an audio signal which constitutes a signal by a detection means to be beyond a predetermined reference valueand to record a sound on a recording medium while an audio signal is changing within a predetermined base period.

[0009]When the recording and reproducing systems according to claim 9 input 1 or two or more signalschange of an inputted signal is detected and change of a video signal which constitutes a signal is detectedA video signal is recorded on a predetermined recording mediumand while a level of an audio signal which constitutes a signal is beyond a predetermined reference value and an audio signal is changing within a predetermined base perioda sound is recorded on a recording medium.

[0010]At least the recording medium according to claim 10 Picture image data and voice dataInformation which shows change of information and voice data in which information which shows change of picture image dataand information which shows change of voice data are recordedand change of picture image data is shown is matched and recorded on

picture image data and voice data.

[0011]In the recording and reproducing device according to claim 1an input means inputs 1 or two or more signalsThe 1st recording device records a signal inputted by an input means on a predetermined recording mediumA reproduction means reproduces a signal recorded on a recording medium by the 1st recording deviceWhen a detection means detects change of a signal reproduced by reproduction meansthe 2nd recording device matches with a signal information which shows change of a signal when change of a signal is detected by a detection means and it records on a recording mediumWith record to a recording medium of a signal by the 1st recording deviceindependently a reproduction meansA signal recorded on a recording medium is reproduceda detection means detects change of a signal reproduced by reproduction meansand when change of a signal is detected by a detection meansthe 2nd recording device matches with a signal information which shows change of a signaland records it on a recording medium.

[0012]In the recording and reproducing systems according to claim 7with record to an inputted recording medium of 1 or two or more signalsindependentlyWhen a signal recorded on a recording medium is reproducedchange of a reproduced signal is detected and change of a signal is detectedinformation which shows change of a signal is matched with a signaland it records on a recording medium.

[0013]In the recording and reproducing device according to claim 8an input means inputs 1 or two or more signalsWhen a detection means detects change of a signal inputted by an input means and change of a video signal from which an image recording means constitutes a signal by a detection means is detectedA video signal is recorded on a predetermined recording mediuma voice recording means is beyond a reference value predetermined in a level of an audio signal which constitutes a signal by a detection meansand while an audio signal is changing within a predetermined base perioda sound is recorded on a recording medium.

[0014]When 1 or two or more signals are inputtedchange of an inputted signal is detected in the recording and reproducing systems according to claim 9 and change of a video signal which constitutes a signal is detectedA video signal is recorded on a predetermined recording mediuma level of an audio signal which constitutes a signal is beyond a predetermined reference valueand while an audio signal is changing within a predetermined base perioda sound is recorded on a recording medium.

[0015]In the recording medium according to claim 10at least Picture image dataInformation which shows change of information and voice data in which voice datainformation which shows change of picture image dataand information which shows change of voice data are recordedand change of picture image data is shown is matched and recorded on picture image data and voice data.

[0016]
[Embodiment of the Invention]Drawing 1 is a block diagram showing the example of composition of the 1 embodiment of the video voice recording and reproducing device which applied the recording and reproducing device of this invention. The record signal-processing system 1 changes into digital picture image data and voice data the video signal and audio signal which were inputtedrespectivelyand is made as [perform / compression processing]. The signal detection system 2 detects change of picture image dataand is made as [output / the information which shows it]. The record signal-processing system 1 is made as [record / match the information outputted from the signal

detection system 2 with the picture image data which changedand / it / on the recording medium 5 (reproduction means) / as additional information (ID)].

[0017]The regenerative-signal processor 3 is made as [divide / into picture image datavoice dataand additional information / the reproduced data]. And an expansion process is performed to picture image data and voice dataand it is made as [change / into an analog signal]. The signal detection system 4 detects change of picture image dataand is made as [output / the information which shows it]. The regenerative-signal processor 3 is made as [record / match the information outputted from the signal detection system 4 with the picture image data which changedand / it / on the recording medium 5 / as additional information].

[0018]The recording medium 5 is constituted by a hard diskan optical discmemory cardetc.and is made as [record / by control of the system controller 7 mentioned later / the signal supplied from the record signal-processing system 1]. The recorded data is reproduced and it is made as [supply / the regenerative-signal processor 3].

[0019]The recording control signal input system 6 is constituted by the keyboard etc.and is made as [supply / to the system controller 7 / the recording control signal corresponding to the key operation which the user inputted]. The reproduction control signal input system 8 is constituted by a keyboardmouseetc.and is made as [supply / to the system controller 7 / the reproduction control signal corresponding to the key operation which the user inputted]. ROM the system controller 7 remembers a predetermined control program to be (read only memory)It comprises a CPU (central processing unit) etc. which perform processing according to a control programand is made as [control / according to the control signal inputted from the recording control signal input system 6 or the reproduction control signal input system 8 / each part].

[0020]The record signal-processing system 1the signal detection system 2the recording medium 5the recording control signal input system 6the reproduction control signal input system 8and the system controller 7Constituting a recording systemthe regenerative-signal processor 3the signal detection system 4the recording medium 5the recording control signal input system 6the reproduction control signal input system 8and the system controller 7 constitute the reversion system.

[0021]Drawing 2 is a block diagram showing the example of composition of the recording system shown in drawing 1. The video-signal processor 11 (input means) is made as [output / it / return the video signal inputted from VTR etc. to a baseband signaland]. The camera-signal-processing system 12 (input means) is made as [output / it / return the video signal inputted from the video camera etc. to a baseband signaland]. The tuner system 13 (input means) is made as [output / them / return the video signal and audio signal which were inputted via the antenna to a baseband signaland].

[0022]The video-signal change system 14 is made according to control of the system controller 7 as [switch / if needed / the signal supplied from the video-signal processor 11the camera-signal-processing system 12and the tuner system 13]. The video-signal A/D conversion system 15 is made as [change / into digital picture image data / the video signal inputted from the video-signal change system 14]. The video-signal detection control system 16 (detection means) detects change of picture image dataand is made as [output / additional information (ID) including the information which shows it]. The video-signal-band compression processor 17 is made as [output / to the inputted picture image data / the compression processing by methodssuch as MPEG (Moving Picture

Experts Group]/ perform and].

[0023]The speech-signal-processing system 18 (input means) adjusts the level of an audio signal etc. which were inputted from VTR etc.and is made as [output]. The mike input speech processing system 19 (input means) adjusts the level of an audio signal etc. which were inputted from microphonessuch as a video cameraand is made as [output]. The audio signal change system 20 is made according to control of the system controller 7 as [switch / if needed / the audio signal supplied from the tuner system 13the speech-signal-processing system 18and the mike input speech processing system 19].

[0024]The audio signal A/D conversion system 21 is made as [output / it / change the inputted audio signal into digital voice dataand]. The audio signal detection control system 22 (detection means) is made as [output / detect change of the inputted voice data and / corresponding additional information]. The audio signal bandwidth compression processor 23 is made as [output / the inputted voice data / compress and].

[0025]The record data processing system 24 (the 1st recording devicethe 2nd recording devicean image recording meansvoice recording means)It is made as [output / the additional information supplied from the picture image datathe voice data from the audio signal bandwidth compression processor 23the video-signal detection control system 16and the audio signal detection control system 22 from the video-signal-band compression processor 17 / superimpose and].

[0026]Nextwhen recording the inputted video voice signalchange of an image is detected simultaneously and the operation in the case of recording as ID which has the format which mentions it later with reference to <u>drawing 7</u> is explained.

[0027]After the video signal from VTR etc. which were inputted into the video-signal processor 11 is returned to baseband signalssuch as YUVit is supplied to the video-signal change system 14. After the video signal supplied to the camera-signal-processing system 12 is returned to baseband signalssuch as YUVit is supplied to the video-signal change system 14. After the signal of a predetermined broadcasting station tunes in the signal inputted into the tuner system 13 from the antennait is returned to baseband signalssuch as YUVa video signal is supplied to the video-signal change system 14and an audio signal is supplied to the audio signal change system 20.

[0028]The audio signal from VTR etc. which were inputted into the speech-signal-processing system 18 is supplied to the audio signal change system 20after a level etc. are adjusted. The audio signal inputted from the microphone of the video cameraetc. is supplied to the audio signal change system 20after a level etc. are adjusted by the mike input speech processing system 19.

[0029]Those either is switched by control of the system controller 7and the video signal from the video-signal processor 11the camera-signal-processing system 12and the tuner system 13 supplied to the video-signal change system 14 is outputted. In the video-signal A/D conversion system 15after the video signal outputted from the video-signal change system 14 is changed into digital picture image datait is supplied to the video-signal detection control system 16.

[0030]In the video-signal detection control system 16based on a histograminter-frame differencea motion vectoretc.change of an image is detected so that it may mention later with reference to <u>drawing 4</u>. And the additional information which shows change of an image is supplied to the record data processing system 24. Picture image data is supplied to the video-signal-band compression processor 17. The picture image data supplied to

the video-signal-band compression processor 17 is supplied to the record data processing system 24after compression processing by compression methodssuch as MPEGis performed.

[0031]On the other handthe either is switched and outputted according to control of the system controller 7and the audio signal supplied to the audio signal change system 20 from the tuner system 13the speech-signal-processing system 18and the mike input speech processing system 19 is supplied to the audio signal A/D conversion system 21. After the audio signal supplied to the audio signal A/D conversion system 21 is changed into digital voice datait is supplied to the audio signal detection control system 22. In the audio signal detection control system 22an audio change is detected and the additional information which shows an audio change is supplied to the record data processing part 24. Voice data is supplied to the audio signal bandwidth compression processor 23. The voice data supplied to the audio signal bandwidth compression processor 23 is supplied to the record data processing system 24after compression processing by compression methodssuch as MPEGis performed.

[0032]The picture image data from the video-signal-band compression processor 17 supplied to the record data processing system 24After the voice data from the additional information and the audio signal bandwidth compression processor 23 from the video-signal detection control system 16 and the audio signal detection control system 22 is superimposedit is supplied to the recording medium 5and it is recorded by a predetermined recording form so that it may mention later with reference to drawing 8. Additional information is associated and recorded on picture image data and voice data as ID which has the predetermined format which consists of additional informationa character codeetc. so that it may mention later with reference to drawing 7.

[0033]Change of the video signal and audio signal which were inputted as mentioned above is detectedand ID (additional information) including the information showing the change relatesand is recorded on a video signal and an audio signal.

[0034]Drawing 3 is a block diagram showing the example of composition of the reversion system of the video voice recording and reproducing device of drawing 1. The regenerative data processor 31 is made as [divide / into picture image datavoice dataand additional information / the data reproduced from the recording medium 5]. The video-signal-band expansion process system 32 is made as [perform / to the video signal by which compression processing was carried out / by MPEG etc. / an expansion process]. The video-signal detection control system 38 (detection means) detects change of picture image dataand is made as [output / the additional information which consists of information which shows it]. The video-signal D/A conversion system 39 is made as [change / into the video signal of an analog / the inputted picture image data]. The video-signal-outputs processor 40 is made as [output / the inputted video signal / encode and].

[0035]The audio signal zone expansion process system 41 is made as [elongate / the voice data by which compression processing was carried out by MPEG etc.]. The audio signal detection control system 42 (detection means) is made as [supply / to the audio signal D/A conversion system 43 / voice data] while detecting change of the inputted voice data and outputting it. The audio signal D/A conversion system 43 is made as [change / into the audio signal of an analog / the inputted voice data]. The voice signal output processor 44 is made as [output / the inputted audio signal / encode and].

[0036]The option processor 45 (a providing meansdisplay control means)The information which shows that ID supplied from the regenerative data processor 31i.e.an imageand a sound changedAnd the image which changed is searched based on picture image data and voice dataand the video signal corresponding to a retrieval picture is createdand the video-signal-outputs processor 40 is suppliedor it is made as [transmit / picture image datavoice dataand ID / outside] via the telephone line and the network.

[0037]Drawing 4 is a block diagram showing the example of composition of the video-signal detection control systems 16 and 38 shown in drawing 2 and drawing 3. The histogram difference detection block 51 creates the histogram of the pixel level of each pixel which constitutes each screen for every color component of the inputted picture image datacalculates a difference with the histogram of the screen in front of oneand is made as [output / a calculation result].

[0038]The inter-frame difference detection block 52 comprises a frame memory etc. which memorize picture image datacalculates the difference of the inputted picture image data and the picture image data delayed by one framecalculates accumulation of the difference quantity furtherand is made as [output / the result of an operation].

[0039]The motion vector detection block 53 asks for the representative point of a predetermined frameand the representative point of the frame in front of oneand is made as [output / the motion vector which detected and detected the inter-frame motion vector from the difference of the position of the representative point of each frame with what is called a representative point matching system].

[0040]As opposed to the detection result to which the detection judgment part 54 is supplied from the histogram detection block 51the inter-frame difference detection block 52and the motion vector detection block 53A predetermined threshold is set uprespectivelyit is judged as that from which the inputted picture image data changed when the detection result exceeding a threshold was obtainedthe information which shows thatand ID including a detection result are generatedand it is made as [supply / the option processor 45].

[0041]Drawing 5 is a block diagram showing the example of composition of the audio signal detection control systems 22 and 42 shown in drawing 2 and drawing 3. It judges that the level variation detection block 61 had change of a sound level when detected the inputted voice dataa level was detecteda level was compared at intervals of each frame and difference aroseand is made as [output / it / include the information which shows it in ID and].

[0042]The phase reference detection block 62 judges at least L(left)-R (right) to be that from which voice data changed when the inputted voice data was a stereothe difference of the volume between LR arose or phase relation changedand it is made as [output / it / include in ID the data in which that is shownand]. The difference (deltaS) of the volume between LR can be searched forfor example with a following formula.

[0043]deltaS= (L_1-R_1) - (L_2-R_2)

[0044]the voice data in the frame into which L_1 and R_1 were inputted now in the above-mentioned formula -- the left -- (-- L) -- the right -- (-- the volume of R) is expressedrespectively and L_2 and R_2 express the volume of the right and left of the voice data in the frame of one frame agorespectively.

[0045]To the voice data in each inputted framethe spectrum difference detection block 63 performs FFT computationand detects a spectrum. And when a difference arises in the

voice spectrum of each frameit is judged as that from which voice data changedand is made as [output / ID including the information which shows that].

[0046]Drawing 6 is a block diagram showing the example of composition of the option processor 45 shown in drawing 3. The ID discrimination control section 71 is made as [input / from the regenerative data processor 31 / ID]. The recording-medium interface 72 is made as [input / ID from the regenerative data processor 31picture image datavoice dataetc.].

[0047]CPU(central processing unit) 73It is made as [control / according to the control program memorized by the storage parts store 74 constituted by ROM (read only memory)RAM (random access memory)etc. / each part]. It is made as [supply / to the controlling-display part 75 / the data corresponding to a retrieval picture]. The controlling-display part 75 is made as [output / to the video-signal-outputs system 40 / the RGB code corresponding to the retrieval picture which was memorized to the frame memory which builds in the data corresponding to the retrieval picture supplied from CPU73and was memorized to the frame memorya YUV signaletc.].

[0048]ID to which the modem network control section 76 was supplied by control of CPU73 from the ID discrimination control section 71Or it is made as [transmit / IDpicture image dataand voice data which were supplied from the recording-medium interface 72 / via a network / to other host computers / via a telephone line etc.].

[0049]I/O control unit 77 is made as [output / picture image datavoice dataand ID / outside] via a serial busa parallel busetc.

[0050]Nextrecord a video signal and an audio signal on the recording medium 5and the record reproduction to the recording medium 5 at the idle time which is not performed as background processingChange of the picture image data and voice data which were recorded on the recording medium 5 is detectedand the operation in the case of recording on the recording medium 5 by setting to ID the information which shows it is explained.

[0051]The picture image datavoice dataand additional information which were reproduced from the recording medium 5 are supplied to the regenerative data processor 31. The video voice data and additional information which were supplied to the regenerative data processor 31 are divided into picture image datavoice dataand additional informationpicture image data is supplied to the video-signal-band expansion process system 32and voice data is supplied to the audio signal zone expansion process system 41. Additional information is supplied to the option processor 45.

[0052]After being elongated and changing into the original picture image data the picture image data supplied to the video-signal-band expansion process system 32it is supplied to the video-signal detection control system 38. Change of the elongated picture image data is detected in the video-signal detection control system 38. That isin the histogram difference detection block 51the difference of an inter-frame histogram is detected and a detection result is supplied to the detection judgment part 54. In the inter-frame difference detection block 52the difference for every pixel of inter-frame picture image data is takenand the accumulation about all the pixels calculates. And accumulation of the difference quantity is supplied to the detection judgment part 54 as a detection result. It is also possible to divide one frame into two or more areato calculate accumulation of a difference quantity for every areaand to detect the change in predetermined area instead of calculating one-frame the accumulation of an about of the whole at this time. In the motion vector detection block 53an inter-frame motion vector is detected and a detection

result is supplied to the detection judgment part 54.

[0053]In the detection judgment part 54it is judged whether the inputted video signal changed based on the detection result supplied from the histogram detection block 51the inter-frame difference detection block 52and the motion vector detection block 53. For examplewhen a motion vector is detected by the motion vector detection block 53it is judged that the photographic subject moved. When change of a histogram is detected by the histogram detection block 51 and a motion vector is not detected for exampleit is judged that the luminosity of the photographic subject changed.

[0054]And a decision result is included in ID (additional information) which has a format as shown in <u>drawing 7</u>and is supplied to the option processor 45. Picture image data is supplied to the video-signal D/A conversion system 39.

[0055]After the picture image data supplied to the video-signal D/A conversion system 39 is changed into the video signal of an analogit is supplied to the video-signal-outputs processor 40. In the video-signal-outputs processor 40after the inputted video signal is encodedit is outputted. The outputted video signal is displayed on the display etc. which are not illustrated.

[0056]On the other handthe additional information supplied from the regenerative data processor 31 is supplied to the record data processing system 24 of a recording systemand it relates with picture image data and voice data when change is detectedand is made to record on the recording medium 5 in the option processor 45. It enables this to search the image and sound in the time of an image changing based on additional information. That isadditional information (ID) will be recorded per framethe field which describes the motion vector of a video change detection result and a photographic subject will be providedand a detection result will be described by those fields so that it may mention later. Thereforethe image and sound of a portion from which picture image data changed can be searched by referring to the field where the motion vector of a video change detection result and a photographic subject is described.

[0057]After an expansion process is performed and the voice data supplied to the audio signal zone expansion process system 41 is changed into the original audio signalit is supplied to the audio signal detection control system 42. Change of voice data is detected [in / at least in the level variation detection block 61 and L-R which were shown in <u>drawing 5 /</u> the phase reference detection block 62 and the spectrum difference detection block 63] in the audio signal detection control system 42.

[0058]As mentioned abovein the level variation detection block 61voice data is detectedthe level of inter-frame voice data is comparedand a comparison result is supplied to the detection judgment part 64. And when the difference beyond a predetermined reference value arisesit is judged by the detection judgment part 64 that voice data changed. When voice data is a stereothe level of a sound on either side is compared and a comparison result is supplied [in / at least in L-R / the phase reference detection block 62] to the detection judgment part 64. And when the level difference (volume difference) beyond a predetermined reference value is detectedit is judged by the detection judgment part 64 that voice data changed. In the spectrum difference detection block 63FFT calculates to the sample of the voice data in each framethe voice spectrum of each frame is detectedthe difference of a voice spectrum further inter-frame [each] is searched forand the detection judgment part 64 is supplied. And when the difference beyond a predetermined reference value is detected by the voice spectrum of each frameit

is judged by the detection judgment part 64 that voice data changed.

[0059]The decision result by the detection judgment part 64 is supplied to the option processor 45 as additional information as shown in drawing 7. The additional information from the audio signal detection control system 42 is supplied to the record data processing system 24 of a recording systemis matched with the picture image data which changedand it is made to record on the recording medium 5 in the option processor 45. It enables this to search the sound and image in the time of a sound changing based on additional information. That isadditional information (ID) will be recorded per framethe field which describes a phonetic change detection result will be providedand a detection result will be described by this field so that it may mention later. Thereforethe sound and image of a portion from which voice data changed can be searched by referring to the field where a phonetic change detection result is described.

[0060]The voice data supplied to the audio signal detection control system 42 is supplied to the audio signal D/A conversion system 43. After the voice data supplied to the audio signal D/A conversion system 43 is changed into the audio signal of an analogit is supplied to the voice signal output processor 44and after being encodedit is outputted.

[0061]Thusthe idle time when the usual record reproduction processing to the recording medium 5 is not performed is usedChange of the picture image data and voice data which were recorded on the recording medium 5 is detectedand ID (additional information) including the information which shows that the image and the sound changed can be matched with the picture image data and voice data in the time of change being detectedand can be recorded on the recording medium 5.

[0062]When recording the video voice signal inputted into the recording medium 5 from the video camera for surveillanceetc.the additional information currently recorded on the recording medium 5 is referred toFrom the data currently recorded on the video change detection result in additional informationthe photographic subject motion vectorand the phonetic change detection resultthe frame from which the image and the sound are not changing is searchedand a new video voice signal can be recorded on the portion. Therebyonly the picture image data and voice data in the time of either changing at least of an image and a sound can remain in the recording medium 5.

[0063]For examplesince an image and a sound when in the case of the image and sound which were photoed with the video camera for surveillanceetc. a photographic subject moves or a sound changes have an important meaningIt becomes possible by eliminating changeless image and sound and recording a new image and sound there to use the recording medium 5 efficiently.

[0064]Only when a video signal and an audio signal are recordedchange of a video signal and an audio signal is detected and a video signal and an audio signal changea video signal and an audio signal can be recorded. By in that casethe video-signal detection control system 16 and the audio signal detection control system 22 of a recording system which were shown in drawing 2. As it mentioned above with reference to drawing 4 and drawing 5when change of picture image data and voice data is detectedthe additional information which shows that is supplied to the option processor 45the picture image data and voice data at the timeand additional information are matchedand it is recorded on the recording medium 5.

[0065]Since only the image and sound at the time of changing an image and a sound can be recorded by thisit is effective in a use which records the image photoed with the video

camera for surveillanceetc.and the recording medium 5 can be used efficiently.

[0066]In a recording system also while reproducing and displaying the picture image data recorded on the recording medium 5 on the display which is not illustratedWhen change of the video signal inputted from the camera system is detected and change of a video signal is detectedthe display of a display can be compulsorily switched to the image into which it was inputted from the camera system.

[0067]That isby switching an internal switch in the video-signal change system 14the video signal from a camera system inputted from the camera-signal-processing system 12 is outputted selectivelyand is supplied to the video-signal A/D conversion system 15. In the video-signal A/D conversion system 15the inputted video signal is changed into digital picture image dataand is supplied to the video-signal detection control system 16. In the video-signal detection control system 16as mentioned above with reference to drawing 4change of the inputted picture image data is detected by the detection judgment part 54 for every framefor example. And a detection result is supplied to the system controller 7. Therebythe system controller 7 can recognize change of picture image data.

[0068]When change of a video signal has been recognized by the detection result from the video-signal detection control system 16it is ordered the system controller 7 so that the video signal inputted from the camera system supplied via the video-signal change system 14 may be made to encode and output to the video-signal-outputs processor 40. According to the instructions from the system controller 7the video-signal-outputs processor 40 encodes the video signal from the camera system supplied via the video-signal change system 14and displays a corresponding image on a display.

[0069]The image can be displayed on a display when the video signal inputted from the camera system has changeeven if it is during reproduction of the picture image data recorded on the recording medium 5 by this.

[0070]Drawing 7 is a figure showing the example of a format of above-mentioned ID. The following items are described by ID. Namelya record date time second () [YEARMONTHDAYHOUR and] MINUTESECONDan input source (INPUT SOURCE). (For exampleVTRa tunera video cameraetc.)channel numbers (CHANNEL)ID category (ID CATEGORY) (for examplea charactermotion information)a video change detection resulta photographic subject motion vectora phonetic change detection resultetc. are described.

[0071]Drawing 8 shows the recording form in case ID shown in drawing 7 is recorded. In drawing 8 (A)it is considered as the unit of one block of the VIDEO data and AUDIO data for one frameand each block is recorded on the predetermined field to which the recording medium 5 continued physically or logically. And each ID which carries out frame correspondence is recorded on the predetermined field other than the field where the above-mentioned frame was recorded which continued physically or logically. On the other handin drawing 8 (B)it is considered as the VIDEO data for one frameAUDIO dataand the unit of one block of IDand each block is recorded on the predetermined field to which the recording medium 5 continued physically or logically.

[0072]Drawing 9 is a figure showing the display example of the retrieval picture which searches data when change of an image or a sound is detected based on ID recorded on the recording medium 5and displays search results. In this exampletime when change is detectedand the concrete contents of that change are displayed. That isin the case of this exampleit is shown that an audio change was detected during the time 10:00 thru/or 10:03.

It is shown that the motion of a photographic subject was detected the period of the time 14:00 thru/or 14:22 and the time 02:34 thru/or during 02:38. It is shown that change of the luminosity of a photographic subject was detected the time 03:22 thru/or during 03:25.

[0073]And by choosing the predetermined item of the detection result displayed on the retrieval picture using the mouse etc. which constitute the reproduction control signal input system 8for examplethe picture image data and voice data corresponding to the selected item are reproducedand it can be displayed on a scope. That iswhich item of the retrieval picture displayed on the display was chosen based on operation of the reproduction control signal input system 8 judges the system controller 7and it orders the recording medium 5 reproduction of the picture image data corresponding to the selected itemand voice data. The recording medium 5 reproduces the picture image data and voice data corresponding to the selected item according to the instructions from the system controller 7and supplies them to the regenerative data processor 31. Hereafterthe image corresponding to the reproduced picture image data is displayed on a display like the case where it mentions above.

[0074]Thusonly the picture image data and voice data of a portion in which change was detected are promptly and easily renewable.

[0075]In the case where change of the inputted video signal or audio signal is detected as mentioned aboveSince the image and audio signal which were inputtedand additional information are continuously recorded on the recording medium 5 at the time of continuous recording mode (mode which records an image and a sound continuously irrespective of whether it changed or not)When change is detectedthe information which shows that change was detected is described in the predetermined field of additional informationand this additional information is matched with the video signal and audio signal in the time of change being detectedand can be recorded on the recording medium 5. At the time of intermittent recording mode (mode which records an image and a sound only when it changes). The information which shows that change was detected is described in the predetermined field of additional informationand the additional informationand the video signal and audio signal in the time of change being detected can be recorded on the recording medium 5.

[0076]The additional information the information which shows that change was detected was described to be via the modem network control section 76When it transmits to other computers which were connected to the networkor additional information is recorded on the field which can be accessed from the exterior and there is a transfer request from other computersthe additional information can be transmitted to the computer.

[0077]When the video signal from two or more video cameras is inputted into the camera-signal-processing system 12the picture image data which recorded two or more picture image data on the recording medium 5 simultaneouslyand was recorded on the recording medium 5 is reproduced one by oneand change of picture image data can be detected. Similarlywhen the audio signal from microphonessuch as two or more video camerasis inputted into the mike input speech processing system 18the voice data which recorded two or more voice data on the recording medium 5 simultaneouslyand was recorded on the recording medium 5 is reproduced one by oneand change of voice data can be detected.

[0078]In television broadcastingthe processing which detects change of the image by the video-signal detection control systems 16 and 38and the processing which detects change

of the sound by the audio signal detection control systems 22 and 42 can be appliedwhen detecting CM (commercials). It can applyalso when detecting change (scene change) of a scene. And when reproducing after that by recording detected change as IDit prevents from reproducing CM or the change of a scene can be searched.

[0079]By assigning the video signal from the video camera for surveillanceetc. to a predetermined input channel in the above-mentioned embodimentIt becomes possible to build the device provided with the search service which searches a monitoring functionthe record reproduction function which carries out record reproduction of the usual programthe image from the video camera for surveillanceand the image of the program inputted from other input channels. In that casethe above-mentioned embodiment shall process simultaneously the video voice signal from two or more input channels.

[0080]In the above-mentioned embodimentalthough the video signal from one camera system shall be inputted into the camera-signal-processing system 12the video signal from two or more camera systems is able to be inputted simultaneously.

[0081]In the above-mentioned embodimentDVD (digital versatile disc)a mini disc (MD)a (trademark)and the thing in which other random access is possible other than an optical disca hard diskand a memory card can be used as a recording medium.

[0082]

[Effect of the Invention]According to the recording and reproducing device according to claim 1 and the recording and reproducing systems according to claim 7. With record to the inputted recording medium of 1 or two or more signalsthe signal recorded on the recording medium is reproduced independentlySince the information which shows change of a signal is matched with a signal and it was made to record on a recording medium when change of the reproduced signal was detected and change of a signal was detectedchange of picture image data and voice data is efficiently detectable by background processing.

[0083]According to the recording and reproducing device according to claim 8 and the recording and reproducing systems according to claim 9. When 1 or two or more signals are inputtedchange of the inputted signal is detected and change of the video signal which constitutes a signal is detectedSince the video signal was recorded on the predetermined recording mediumand the sound was recorded on the recording medium while the level of the audio signal which constitutes a signal was beyond a predetermined reference value and the audio signal was changing within a predetermined base perioda recording medium can be used efficiently.

[0084]According to the recording medium according to claim 10at least Picture image data and voice dataThe information which shows change of the information and voice data in which the information which shows change of picture image dataand the information which shows change of voice data are recordedand change of picture image data is shownSince it matches with picture image data and voice data and was made to be recordedthe picture image data and voice data in the time of picture image data or voice data changing can be searched easily.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is a block diagram showing the example of composition of the 1 embodiment of the video voice recording and reproducing device which applied the recording and reproducing device of this invention.

[Drawing 2]It is a block diagram showing the example of composition of the recording system of the video voice recording and reproducing device of drawing 1.

[Drawing 3]It is a block diagram showing the example of composition of the reversion system of the video voice recording and reproducing device of drawing 1.

[Drawing 4]It is a block diagram showing the example of composition of the video-signal detection control systems 16 and 38.

[Drawing 5]It is a block diagram showing the example of composition of the audio signal detection control systems 22 and 42.

[Drawing 6]It is a block diagram showing the example of composition of the option processor 45 of drawing 3.

[Drawing 7]It is a figure showing the format of additional information.

[Drawing 8]It is a figure showing the recording form of record data.

[Drawing 9]It is a figure showing the display example of a retrieval picture.

[Description of Notations]

1 A record signal-processing system and 2 A signal detection system and 3 A regenerative-signal processor and 4 Signal detection system5 A recording medium and 6 A recording control signal input system and 7. A system controller and 8 A reproduction control signal input system and 11. A video-signal processor12 camera-signal-processing systemand 13. A tuner system and 14 [An audio signal change system and 21 / An audio signal A/D conversion system and 22.] A video-signal change system15 video-signal A/D conversion systemand 16 A video-signal detection control system and 17 A video-signal-band compression processor18 speech-signal-processing system19 mike-input speech processing systemand 20 An audio signal detection control system and 23 An audio signal bandwidth compression processor and 24. A record data processing system31 regenerative-data processor32 video-signal-band expansion process systemand 38 [An audio signal detection control system 43 audio-signal D/A conversion system and 44.] A video-signal detection control system and 39 A video-signal D/A conversion system40 video-signal-outputs processorand 41 An audio signal zone expansion process system and 42 A voice signal output processor and 45 An option processor51 histogram difference detection block52 inter-frame difference detection block53 motion-vector detection blockand 54 At least a detection judgment part61 level-variation detection blockand 62 L-R A phase reference detection block and 63. A spectrum difference detection block and 64 A detection judgment part71 ID-discrimination control sectionand 72 A recording-medium interface73 CPU7. 5 A controlling-display part and 76 A modem network control section and 77 An I/O control unit and 74 Storage parts store